

# The Characteristics of the Hunminjeongeum Medial Letters: from the Perspective of Writing System<sup>\*</sup>

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This study investigates the characteristics of the Hunminjeongeum medial letters from the perspective of writing system. The second derivation letters(再出字) and the composite letters(相合字) related to them were examined in terms of the constraints on letter shape, the operating system of the letters, and the constraints on the syllabic block. The present study provides answers to the questions about why a dot was employed as a graphical device for an onglide [j] of the second derivation letters, and why only the second derivation letters of all diphthongal letters were included in the eleven Hunminjeongeum medial letters, and why ! and \_l were described separately and different from the SDs and the other composite letters. A graphical device · was used for an onglide [j] instead of l to avoid confusion in the operating system of the letters. The eleven Hunminjeongeum medial letters are a collection of unitary letters to form composite medial letters. ! and \_l were unavoidable choices to avoid confusion in the operating system of the letters, so that they fill the *case vide* in the symmetric sets of diphthongal medial letters, showing that the vertical medial letter precedes the horizontal one 'beyond' the medial letter position which is empty.

**Keywords:** Hunminjeongeum, medial letters, vowels, writing system, graphical device, unitary letters, composite medial letters

## 1. Introduction

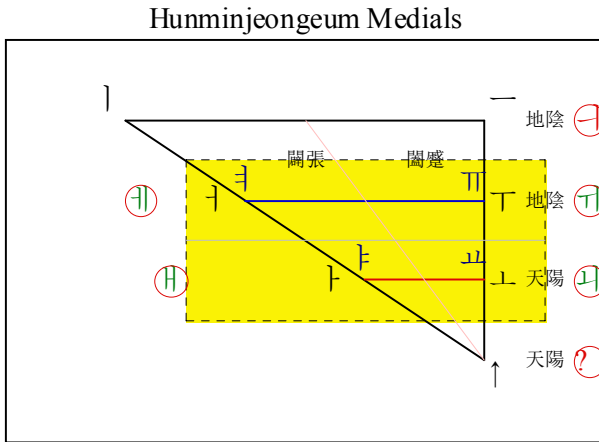
The chapter of Samples and Significance(例義篇), *Hunminjeongeum Haerye*bon(訓民正音 解例本), lists a total of eleven medial letters.<sup>1)</sup> These

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eleven medial letters represent Korean vowels, whether Sino-Korean or native-Korean, in the 15<sup>th</sup> century. They are classified into three categories according to the stages of graphical derivation: 3 basic medials(hereafter, Basics) which include  $\cdot$ ,  $ㅡ$ , and  $ㅣ$ ; 4 first derivations(hereafter, FDs) which include  $\ddot{\cdot}$ ,  $\vdash$ ,  $\overline{\cdot}$ , and  $\cdot\downarrow$ ; 4 second derivations(hereafter, SDs) which include  $\ddot{\cdot}$ ,  $\vdash$ ,  $\overline{\cdot}$ , and  $\cdot\downarrow$ .

The eleven Hunminjeongeum medial letters and six composite medial letters are depicted in Figure 1.<sup>2)</sup>



**Figure 1.** The eleven Hunminjeongeum medial letters and six composite medial letters, which is adapted from Park(2014).

As shown in Figure 1, the Basics, ‘ $\cdot$ ’, ‘ $ㅡ$ ’, ‘ $ㅣ$ ’, which are modeled after the shape of the sky, the earth, and the man, respectively, are phonetically considered as corner vowels which may be comparable to /a, u, i/.<sup>3)</sup> They do not only represent monophthongs but also function as graphical devices for the FDs and the SDs.

The FDs are graphically derived from the Basics by combining a dot ( $\cdot$ )

1) This study uses a term “medial letter” or “medial” for a vowel letter representing a syllabic nucleus, in the sense that it occurs in the medial letter position.  
 2) See Park(2014) for the theoretical discussion of the medial letters and their classification.  
 3) See Park(2014) for the discussion of the Basics as corner vowels.

with one of the other Basics(— and |), such that ◡ and ◢ are formed by putting a dot on the top or bottom side of the horizontal bar —, and ㅏ and ㅑ by placing a dot on the right or left hand side of the vertical bar |. As portrayed within a yellow box enclosed by dotted lines in Figure 1, the FDs are located between the corner vowels, such that ◡ and ◢ are positioned between ◌ and — for the horizontal series, while ㅏ and ㅑ are positioned between ◌ and | for the vertical series. They represent monophthongs, neither sequences of syllabic nuclei nor diphthongs.

And the SDs are graphically derived from the FDs by adding a dot to each of the FDs. Their shapes clearly and straightforwardly demonstrate that ◣ and ◤ are formed by adding a dot to the top and bottom sides of ◡ and ◢, respectively, while ㅓ and ㅕ are formed by adding a dot to the right and left hand sides of ㅏ and ㅑ, respectively. The SDs are located at the same position as the FDs, as shown in Figure 1. They do not represent monophthongs but diphthongs beginning with an onglide [j].

It should be noted that composite medial letters can be made by combining the eleven Hunminjeongeum medial letters. As shown in Figure 1, six composite medial letters provided within red circles are formed by composing | on the right hand side of the Basics or the FDs. It seems that these 6 medial letters represent diphthongs that end with an offglide [j], such that ㅡ|, ◡|, ◢|, ◌|, ㅏ|, and ㅑ| represent [uj], [uj], [oj], [aj], [aj], and [əj], respectively, clockwise from ㅡ| in Figure 1.

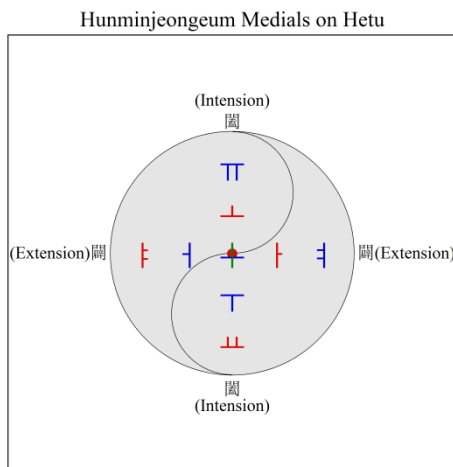
As shown in Figure 1, the SDs graphically differ from the FDs in the number of dots. According to the statement about the SDs provided in the Explanations of the Invention of Letters<sup>4)</sup>, the initial part of the SDs has the same phonetic quality as the vowel denoted by |. This raises a question as to why a dot(◌) of all available graphical devices, neither a horizontal bar(—) nor a vertical bar(|), was used for an onglide [j]. If phonetic quality had been taken into consideration, a vertical bar would have been even more appropriate for [j] than a dot. This suggests that there might be some reasons why a graphical device | or — could not

4) “◡ ㅓ ㅕ ㅑ 起於 | 而兼乎人爲再出也” means “◡, ㅓ, ㅕ, and ㅑ, rising from | and associated with Man, make the Second Derivations.”

be used for an onglide [j]. This study provides an answer to this question under the assumption that it might be due to the constraints on letter shape and the operating system of the letters.

The eleven Hunminjeongeum medial letters are not homogeneous, in that the Basics and the FDs represent monophthongs while the SDs represent diphthongs. Previous studies have attempted to explain why only the SDs of all diphthongal letters were included in the eleven Hunminjeongeum medial letters from the perspectives of the traditional Chinese phonetics (Lee, 1963; Ryu, 1963; 1965), oriental philosophy (Kim, 2012), and modern phonology (Lee, 1972; Kim, 1989), and the relationship between letter shape and phonetic quality (Lee, 1988). Lee (1963) argues that ‘ㄷ, ㅌ, ㄴ, and ㄹ’ were included in the 11 Hunminjeongeum medials, since they constitute a correlation bundle with ‘ㄷ, ㅌ, ㄴ, and ㄹ’ in terms of 4 grades of *hū* (四等呼).<sup>5)</sup> Ryu (1963, 1965) also argues that ‘ㄷ, ㅌ, ㄴ, and ㄹ’ should be included in the 11 Hunminjeongeum medials, since both the FDs ‘ㄷ, ㅌ, ㄴ, ㄹ’ and the SDs ‘ㄷ, ㅌ, ㄴ, ㄹ’ belong to the same category of *kāikōu* (開口). This view would make sense if the Hunminjeongeum medial letters had been based on the concept of 4 grades (四等) of *kāikōuhū* (開口呼). The Hunminjeongeum medials were argued to be associated with *héú* (河圖), or the Yellow River’s Diagram (Kim, 2012). It was taken for granted that ‘ㄷ, ㅌ, ㄴ, and ㄹ’ were included in the 11 Hunminjeongeum medial letters, since the SDs ‘ㄷ, ㅌ, ㄴ, ㄹ’ were paired with the FDs ‘ㄷ, ㅌ, ㄴ, ㄹ’ at four directional faces, as seen in Figure 2.

5) Rhymes are classified into 4 categories of *hū* (四呼) in terms of the phonetic quality of the onglide (介音) of the rhyme: *kāikōuhū* (開口呼), *qichīhū* (齊齒呼), *hékōuhū* (合口呼), and *cuōkōuhū* (撮口呼), according to Lee & Shim (1997). *kāikōuhū* (開口呼) with the literal sense of “open mouth” includes the rhymes without any onglide; *qichīhū* (齊齒呼) with the literal sense of “even teeth” includes the rhymes beginning with an onglide [j]; *hékōuhū* (合口呼) with the literal sense of “closed mouth” includes the rhymes beginning with an onglide [w]; *cuōkōuhū* (撮口呼) with the literal sense of “round mouth” includes the rhymes beginning with an onglide [u]. The Middle Chinese in the era of the Song (宋) dynasty was described by only two terms *kāikōu* (開口) and *hékōu* (合口), each of which has four grades. According to the traditional classification, grades 1 and 2 of the *kāikōu* (開口一二等) correspond to *kāikōuhū* (開口呼) and grades 3 and 4 of the *kāikōu* (開口三四等) to *qichīhū* (齊齒呼), while Grades 1 and 2 of the *hékōu* (合口一二等) correspond to *hékōuhū* (合口呼) and grades 3 and 4 of the *hékōu* (合口三四等) to *cuōkōuhū* (撮口呼). Later in Qing (清) dynasty, *kāikōu* (開口) was further divided into *kāikōuhū* (開口呼) and *qichīhū* (齊齒呼) while *hékōuhū* (合口) was further divided into *hékōuhū* (合口呼) and *cuōkōuhū* (撮口呼). The new classes of *qichīhū* (齊齒呼) and *cuōkōuhū* (撮口呼) are characterized by palatal onglides [j] and [u], respectively.



**Figure 2.** The eleven Hunminjeongeum Medials on Hetu(quoted from Park(2014)).

Kim(1989), beyond the view that both the SDs and the composite medials represent diphthongs(Lee, 1949, 1954; Heo, 1952, 1965; Lee, 1972), provides a phonological interpretation that the SDs are diphthongs while the composite medial letters ending with 丨 are /Vi/, that is, sequences of two syllabic nuclei. Accordingly, only the SDs were included in the eleven Hunminjeongeum medials. Kim(1989) also holds that diphthongs, such as ‘ㅏ, ㅑ,’ failed to be included in the eleven Hunminjeongeum medials because of the constraint on their distribution and the editing errors of the authors of the Hunminjeongeum.

Lee(1988) attributes the inclusion of the FDs and SDs in the 11 Hunminjeongeum medial letters to the success of preserving letter shape with the failure to preserve phonetic quality in the formation of the FDs and to the success of preserving the phonetic quality of 丨 with the failure to preserve the letter shape of 丨 in the formation of the SDs. Lee(1988) is significant that ‘·, —, 丨’ are perceived at once as graphical devices and as independent letters representing monophthongs.

As will be discussed later in (2-8) to (2-10), the Explanations of the Composition of Letters describe that “· or — preceded by 丨 are useless in Korean. Although composite medial letters of a sequence of a horizontal

letter followed by a vertical one may be used for infants' or children's speech or for dialects, they should be composed like ! and \_|, but different from the others in that a vertical medial letter precedes a horizontal one." In other words, they violate the principle of composing medial letters that composite letters have to have a vertical letter preceded by a horizontal one. Kim(2000) classifies ! and \_| as simple vowel letters possibly representing [j<sup>h</sup>] and [j<sup>i</sup>] and suggests that they should be classified as the SDs, since they share “起於 |” or “起 | 聲” with the SDs. He provides dialectal evidence supporting his estimation of the phonetic quality of ! and \_| from Gyeonggi and Chungcheong dialects, based on the descriptions “邊野之語” given in the *Hunminjeongeum Haerye*. However, it is difficult to find studies which have properly investigated from the perspective of writing system why ! and \_| were described separately and different from the other diphthongal letters.

The descriptions and discussions so far lead us to raise the following questions about the Hunminjeongeum medial letters:

#### (1) Questions about the Hunminjeongeum Medials

- (1-1) Why was a dot(·), neither the vertical bar(|) nor the horizontal bar(—), employed as a graphical device for an onglide [j], given the statement “起於 | 而兼乎人”?
- (1-2) Why were only the SDs of all diphthongal medials included in the eleven Hunminjeongeum medial letters?
- (1-3) Why were ! and \_| described separately and different from the other diphthongal letters.

This study investigates the characteristics of the SDs from the perspective of writing system. In particular, the present study examines the SDs in terms of the constraints on letter shape, the operating system of the letters, and the constraints on the syllabic block. Then, this study provides answers to the questions provided in (1).

## 2. Questions and Answers

### 2.1. Question I

The question (1-1) about why a graphical device  $\cdot$  was employed for an onglide [j] of the SDs instead of  $\mid$  can be investigated in terms of the constraints on letter shape and the avoidance of confusion in the operating system of the letters. First of all, it is useful to examine the Explanations of the Composition of Letters(合字解), which is given below in (2).

#### (2) Explanations of the Composition of Letters

- (2-1) 初中終三聲,合而成字。
- (2-2) 初聲或在中聲之上,或在中聲之左。
- (2-3) 中聲則圓者橫者在初聲之下,  $\cdot$   $\text{一}$   $\text{ㄷ}$   $\text{ㅌ}$   $\text{ㄴ}$   $\text{ㄹ}$  是也。
- (2-4) 縱者在初聲之右,  $\mid$   $\text{ㅍ}$   $\text{ㅑ}$   $\text{ㅓ}$   $\text{ㅕ}$   $\text{ㅗ}$  是也。
- (2-5) 終聲在初中之下。
- (2-6) 中聲二字三字合用,如諺語  $\cdot$   $\text{ㅍ}$  爲琴柱,  $\cdot$   $\text{ㅊ}$  爲炬之類。
- (2-7) 其合用並書,自左而右,初中終三聲皆同。
- (2-8)  $\cdot$  一起  $\mid$  聲,於國語無用。
- (2-9) 兒童之言,邊野之語,或有之,當合二字而用,如  $\text{ㅍ}$   $\text{ㅑ}$  之類。
- (2-10) 其先縱後橫,與他不同。

According to the Explanations of the Composition of Letters(合字解), composing three kinds of letters(initials, medials, and finals) makes a character, as described in (2-1). The initial letters lie on the top side or the left hand side of the medial, as described in (2-2). The round or horizontal medial letters lie on the bottom side of the initial letter, to which category belong ‘ $\cdot$   $\text{一}$   $\text{ㄷ}$   $\text{ㅌ}$   $\text{ㄴ}$   $\text{ㄹ}$ ,’ as described in (2-3). On the other hand, the vertical medial letters lie on the right hand side of the initial letter, to which category belong ‘ $\mid$   $\text{ㅍ}$   $\text{ㅑ}$   $\text{ㅓ}$   $\text{ㅕ}$   $\text{ㅗ}$ ,’ as described in (2-4). The final letters lie on the bottom side of the medial letters, as described in (2-5).

Composing two or three medial letters was exemplified by ‘ $\cdot$   $\text{ㅍ}$ ’ “bridge of the string instrument” and ‘ $\cdot$   $\text{ㅊ}$ ’ “torch,” as in (2-6). Composing multiple

letters proceeds from left to right, which commonly applies to the initial, medial, and final letters, as described in (2-7). The former shows a composition of two medials, ‘ㄷ and ㅌ,’ while the latter demonstrates a composition of three medials ‘ㄷ, ㅌ, and ㅍ.’

Composite medials of a sequence of ㅌ followed by ㅍ or ㅍ might be useless in Korean, as described in (2-8). They may represent speech sounds which could occur in infants’ or children’s speech or in dialects, and should be written like ㅌ and ㅍ, with ㅌ properly composed with ㅍ or ㅍ, as described in (2-9). The sequence of a vertical letter followed by a horizontal one is not the same with the other composite medials, as noted in (2-10).

According to the descriptions given in (2) above, the initial letter should always be present and precede the medial one. It would be a contradiction for a medial to precede an initial, in that an initial precedes everything else in its literal sense. Therefore, it can be inferred that the initial letter position is located at the topmost and/or leftmost slot of the syllabic block.<sup>6)</sup> It can also be inferred that there are two medial positions: the horizontal medial position for round or horizontal medial letters(the bottom side of the initial letter) and the vertical medial position for vertical medial letters(the right hand side of the initial letter). Since composing multiple medial letters proceeds from left to right, the horizontal medial position must be located at the left hand side of the vertical medial letter position. Composing multiple horizontal medials is allowed within the horizontal medial position, though not stated explicitly, while composing multiple vertical medials is allowed in the vertical medial position. For example, in ‘ㅌ’, ㅌ co-occurs with ㅌ in the same vertical letter position. The final letters occur on the bottom side of the medial letters. Therefore, the final letter position is always located at the bottom stack of the syllabic block.

6) In Korean, both now and in the 15<sup>th</sup> century, a character is formed by composing initial, medial, and/or final letters into a square block. The final letter representing coda consonants is optional. If a syllable has no initial consonant, the null initial letter ㅇ is used as a placeholder, filling the initial letter position. Therefore, a block must have at least two letters, an initial and a medial. This character shape has an advantage of writing in any direction from left to right, right to left, or from top to bottom, without any confusion in recognition.



The medial letter position lies between the initial and final letter positions. A horizontal medial letter must precede a vertical one if both of them occur in the medial position, since the horizontal medial letter position is located at the left hand side of the vertical medial letter position. The vertical medial letter must not precede the horizontal one within the medial letter positions. For example, in the composition of 丨 and ㄷ, the vertical one 丨 must not precede the horizontal one ㄷ. If 丨 were to precede ㄷ, it would violate the principles of composing letters, since the initial letter would occur on the right hand side of the medial one, contrary to the statement in (2-2). The same is true of the composition of 丨 followed by ㄴ. If a vertical medial letter were to precede a horizontal one, the initial letter would follow the medial one, hence violating the principles of composing letters.

In addition, the principles of the operating system of the letters, though not explicitly stated in the *Hunminjeongeum Haeryebon*, seem to prevent a composition of 丨 followed by a vertical medial letter ㄱ. A composition of 丨 followed by ㄱ does not violate the constraints on letter shape, since two vertical medial letters can co-occur in the vertical medial letter position, forming ㅅ. However, it could cause confusion in the operating system of the letters. Given a medial ㅅ as a composition of 丨 followed by ㄱ, representing a diphthong [aj], the addition of ㅅ as a composition of 丨 followed by ㄱ might have caused confusion in distinguishing between ㅅ for [aj] and ㅅ for [jə]. If an identical letter should stand for two different sounds, it could undermine the stability of the operating system of the letters. As a corollary, it would be inappropriate to use 丨 as a graphical device for an onglide [j]. This problem could be solved by finding an alternative graphical device for an onglide [j]. One of the options would have been to use ㅡ as a graphical device for an onglide [j]. However, the composition of ㅡ followed by ‘ㄷ, ㅌ, ㄴ, or ㄱ’ could also cause problems. A sequence of ㅡ followed by ㄷ would lead to a composite medial letter which has two horizontal medial letters in the horizontal medial letter position. It could also create two composite medial letters of an identical shape, one for [oj] and the other for [jo], which is analogous to the case between ㅅ for [aj] and ㅅ for [jə]. Therefore,

it would also be inappropriate to use — as a graphical device for an onglide [j]. It seems that the only solution to solve the problems at hand should be to employ a graphical device · for an onglide [j]. The employment of · as a graphical device for an onglide [j] could neither cause confusion in the operating system of the letters nor violate the constraints on letter shape. It also creates an environment where | could be exclusively used as a graphical device for an offglide [j]. As a corollary, division of labor could be achieved: a graphical device · for an onglide [j] of the SDs and a graphical device | for an offglide [j] for composite medial letters.

To sum up, a graphical device · was used to stabilize the operating system of the letters by avoiding confusion that could be caused by two letters of an identical shape. By this way, a graphical device · could be exclusively used for an onglide [j] of the SDs while a graphical device | could be exclusively used for an offglide [j] of the composite medial letters.

## 2.2. Question 2

The question (1-2) about why only the SDs of all diphthongal letters were included in the eleven Hunminjeongeum medial letters can also be investigated in terms of the constraints on letter shape and the operating system of the letters, and the constraints on the syllabic block. It is useful to examine the Explanations of the Medial Letters(中聲解) which are given in (3).

### (3) Explanations of the Medial Letters

(3-1) 二字合用者,

(3-2) ㄷ與ㅌ同出於·,故合而爲ㄷㅌ。

(3-3) ㄴ與ㄹ又同出於|,故合而爲ㄴㄹ。

(3-4) ㅍ與ㅑ同出於一,故合而爲ㅍㅑ。

(3-5) ㅓ與ㅕ又同出於|,故合而爲ㅓㅕ。

(3-6) 以其同出而爲類,故相合而不悖也。

(3-7) 一字中聲之與|相合者十,·|—|ㅌㅑㅕㅓㅕㅓㅕㅓㅕㅓ是也。

(3-8) 二字中聲之與 | 相合者四, ㄱ|, ㅋ|, ㆁ|, ㄴ| 是也。

(3-9) | 於深淺闔關之聲, 竝能相隨者, 以其舌展聲淺而便於開口也。

According to the Explanations of the Medial Letters(合字解), composite letters which are called “two letter composite medials(二字合用者),” as described in (3-1), can be formed as follows: ㄱ and ㅋ, commonly rising from ㄱ, are composed into ㄱ|, as described in (3-2); ㆁ and ㄴ, also commonly rising from |, into ㄱ|, as described in (3-3); ㅁ and ㄴ, commonly rising from ㅁ, into ㅁ|, as described in (3-4); ㅁ and ㄴ, commonly rising from |, into ㅁ|, as described in (3-5). It can be inferred that two letters to be composed with each other must belong to the same derivational class and share the same *yinyang* feature. Otherwise, they are not allowed to be composed with each other. Each pair of letters in (3-2) to (3-5), belonging to the same derivational class and sharing the same *yinyang* feature, can properly form a composite medial, as described in (3-6).

As described in (3-7), there are 10 composite medials which are formed by composing one letter medials with | (一字中聲之與 | 相合者): ‘ㄱ|, ㅋ|, ㆁ|, ㄴ|, ㄱ|, ㅋ|, ㆁ|, ㄴ|, ㅁ|, and ㅁ|.’ As described in (3-8), there are 4 composite medials which are formed by composing two letter medials with | (二字中聲之與 | 相合者): ‘ㄱ|, ㅋ|, ㆁ|, and ㄴ|.’ As stated in (3-9), the reason why | can be composed with the Basics and the First and Second Derivations, which are collectively called “深淺闔關之聲,” is that |, which has phonetic properties of an advanced tongue(舌展) and a shallow psychoacoustic image(聲淺), is convenient for mouth opening.

It can be inferred from the descriptions in (3) above that composite medial letters(相合者) are mainly derived by composing non-composite and composite medials with |. Non-composite medials to be composed with | are called one letter medials(一字中聲). They include the Basics and the First and Second Derivations. Composite letters to be composed with | are called two letter medials(二字中聲). The two letter medials(二字中聲) indicate “two letter composite letters(二字合用者).”

It is useful to analyze all the Hunminjeongeum medial letters in terms of graphical class, composite components count, occupied positions count, and phonetic components count. The Hunminjeongeum medial letters

are specified in Table 1.

**Table 1.** The Analysis of the Hunminjeongeum Medial Letters

Medials	Graphical Class	Composite Components Count	Occupied Positions Count	Phonetic Components Count <sup>7)</sup>
·	Basics	1 < · >	1	1 [a]
—		1 < — >	1	1 [u]
		1 <   >	1	1 [i]
ㄷ	FDs	1 < ㄷ >	1	1 [o]
ㅏ		1 < ㅏ >	1	1 [a]
ㅑ		1 < ㅑ >	1	1 [u]
ㅓ		1 < ㅓ >	1	1 [ə]
ㅗ	SDs	1 < ㅗ >	1	2 [jo]
ㅛ		1 < ㅛ >	1	2 [ja]
ㅜ		1 < ㅜ >	1	2 [ju]
ㅠ		1 < ㅠ >	1	2 [jə]
ㅘ	CMs	2 < ㅘ + ㅏ >	2	2 [wa]
ㅙ		2 < ㅗ + ㅛ >	2	4 [joja]
ㅚ		2 < ㅑ + ㅓ >	2	2 [wə]
ㅜ		2 < ㅜ + ㅠ >	2	4 [jujə]
ㅝ		2 < · +   >	2	2 [ɑ]
ㅞ		2 < — +   >	2	2 [ɯ]
ㅟ		2 < ㅘ +   >	2	2 [oj]
ㅠ		2 < ㅏ +   >	1	2 [aj]
ㅡ		2 < ㅑ +   >	2	2 [uj]
ㅢ		2 < ㅓ +   >	1	2 [ə]
ㅣ		2 < ㅗ +   >	2	3 [joj]
ㅤ		2 < ㅛ +   >	1	3 [jaj]
ㅥ		2 < ㅜ +   >	2	3 [juj]
ㅦ		2 < ㅠ +   >	1	3 [jə]
ㅧ		3 < ㅘ + ㅏ +   >	2	3 [waj]
ㅨ		3 < ㅑ + ㅓ +   >	2	3 [wə]
ㅩ		3 < ㅗ + ㅛ +   >	2	5 [jojaj]
ㅪ		3 < ㅜ + ㅠ +   >	2	5 [jujə]

Table 1 lists a total of 29 medial letters of the Basics, the FDs, the SDs, and the CMs(composite medials). First, these 29 medial letters can be classified into three different groups in terms of composite components count: 1, 2, and 3. The single component group includes the Basics, the FDs, and the SDs. The double component group includes “two letter composite letters(二字合用者)” and one letter medials followed by ㅣ. The triple component group includes “two letter composite letters” followed by ㅣ. The eleven Hunminjeongeum medial letters coincide with the single component group.

Second, medial letters can be classified into two groups in terms of the occupied positions count: 1(either horizontal or vertical) and 2(both horizontal and vertical). It is clear that the single component group, including the Basics, the FDs, and the SDs, occupy only one medial letter position, either horizontal or vertical. It should be noted that composite medials ‘ㅈ, ㅊ, ㅊ, ㅊ’ occupying the vertical medial letter position alone do not belong to the eleven Hunminjeongeum medial letters. Therefore, it can be said that non-composite medial letters occupying only one letter position, horizontal or vertical, to the eleven Hunminjeongeum medial letters.

Third, medial letters can be classified into five groups in terms of phonetic components count: from 1 to 5. The Basics and the FDs have only one phonetic component, since they represent monophthongs. The SDs and the CMs have multiple phonetic components. The SDs represent diphthongs that begin with a glide [j]. Composite medials representing diphthongs or triphthongs with an onglide [j] or [w] or with an offglide [j] are available but those representing diphthongs or triphthongs with an offglide [w] do not occur, since vertical medial letters cannot precede horizontal medial letters which may represent [w]. In contrast, diphthongs or triphthongs with an onglide [w] can be represented by composite medials that begin with ㅛ and ㅜ. However, composite medials representing [wi]

7) The present study estimates the phonetic quality of the components of ㅈ, ㅊ, ㅊ, and ㅊ simply by combining phonetic qualities of ㅈ, ㅊ, ㅊ, ㅊ, and ㅣ. Heo(1965) states that ㅈ, ㅊ, ㅊ, and ㅊ were not used to represent native-Korean vowels. See Heo(1965) for more detailed discussion about the estimation of the phonetic quality of composite medial letters.

or [we] are not available in the Hunminjeongeum. ㅜㅣ and ㅡㅣ could have represented [wi] or [we] in the 15<sup>th</sup> century in practice, for ㅣ could have represented a glide in them. It is interesting that ㅜㅣ and ㅡㅣ have changed to [wi] and [we], respectively, later at a certain stage in the development of the Korean language. Composite medials that have 4 or 5 phonetic components are not practical.<sup>8)</sup> It seems that they were derived by a mere application of the principles of inventing letters, though no vowels were represented by them.

To sum up, the single component group that occupies only one medial letter position belongs to the eleven Hunminjeongeum medial letters. In this sense, composite components count and occupied positions count serve as distinctive features of writing system by which the eleven Hunminjeongeum medial letters are distinguished from the others. Simply, the eleven Hunminjeongeum medial letters are at once “the Basics and the First and Second Derivations(深淺闢闢之聲)” and “one letter medials(一字中聲).”

### 2.3. Question 3

The reason why ㅑ and ㅓ were described separately and different from the other diphthongal letters seems to be that they were inevitable to secure the stability of the operating system of the letters. ㅑ and ㅓ seem to be composite medial letters with ㅣ followed by ㅑ and ㅓ, respectively, whose phonetic quality could be an issue. If ㅑ or ㅓ represents an offglide which could be comparable to [w] or [ɰ], ㅑ and ㅓ would represent diphthongs like [iw] and [iɰ], respectively. However, it seems that [iw] and [iɰ] were hardly acceptable in Middle Korean that the inventors were speaking in at that time, though they could be heard in infants' or children's speech or in dialects. They might be useless, as stated in (2-8). If ㅣ should represent a syllabic nucleus as well as ㅑ and ㅓ, ㅑ and ㅓ would represent [ia] and [iɰ], respectively. In such a case, their composite components could have been separated into two different syllabic blocks, so that ㅑ and ㅓ would have been written like ㅑㅣ and ㅓㅣ

8) See Kim(1989) for more discussion about the practicality of composite medial letters.

이으, respectively. If so, they might also be useless, as stated in (2-8).

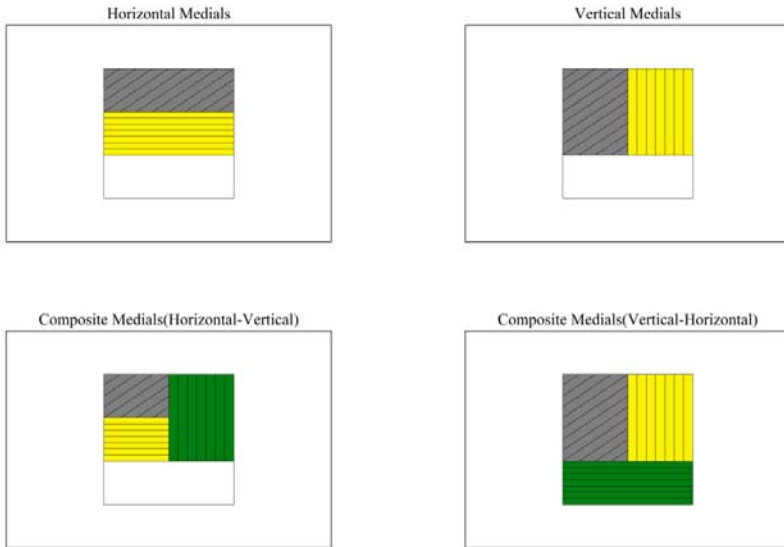
If ㅣ represents an onglide [j], ! and ㄹ would represent [ja] and [ju], respectively. If it is indeed the case, a dot could have been employed as a graphical device for [j], analogous to the SDs. In such a case, ! could have been written as two dots, which would look like ..<sup>9)</sup>, and ㄹ as one dot on the horizontal bar, which would look like ㄹ̣. A composite letter of double identical medial letters(..) was not allowed in the writing system at that time and ㄹ̣ for a new medial letter representing [ja] could have caused confusion with ㄹ̣ for an existing letter representing [o]. This situation could have undermined the stability of the operating system of the letters. That seems to be the reason why sequences of ㅣ followed by ㅂ and ㅅ were provided in the form of ! and ㄹ, respectively.

It should be noted that ! and ㄹ could belong to the same category with the SDs. In this regard, they might be two puzzle pieces to complete two symmetric sets of diphthongal medial letters: ‘·ㅣ, ㅅㅣ, ㅈㅣ, ㅊㅣ, ㅊㅣ, ㅊㅣ, ㅊㅣ’ and ‘! , ㄹ, ㅂ, ㅅ, ㅈ, ㅊ, ㅊ, ㅊ.’ ! and ㄹ, representing [ja] and [ju], could be counterparts of ·ㅣ and ㅅㅣ, representing [aj] and [uj].

! and ㄹ are different from the other diphthongal letters, in that a vertical medial letter precedes a horizontal one, violating the principle of composing medial letters that a horizontal medial letter must precede a vertical one. In principle, composite medials that occupy two different medial letter positions should have a vertical medial letter preceded by a horizontal one ‘within’ the medial letter positions. A vertical medial letter should not precede a horizontal one within the medial letter positions. One way to allow a vertical medial letter followed by a horizontal one complying with this principle would be to establish a hypothesis that in a composite letter the vertical medial letter precedes the horizontal one ‘beyond’ the medial letter position. It is prerequisite that the final letter position should be vacant for the horizontal medial letter. It seems

9) This letter has been used to represent [jA], which correspond to [ja] in the present study. See Kim(2000) for more information about the discussion of the phonetic quality of ! and ㄹ. It should be noted that the discussion about the phonetic quality of .. dates back to Shin Kyeongjun(申景濬)’s *Hunminjeongeumunhae*(訓民正音韻解), Hwang Yunseok(黃胤錫)’s *Ijaenango*(傾齋亂藁), and Yu Heui(柳僖)’s *Eonmunji*(諺文志) as early as the 18<sup>th</sup> century.

that in **ㅏ** and **ㅑ**, the vertical medial letter occupies the vertical medial letter position while the horizontal medial letter occupies the final letter position. This can be explained by the types of syllabic blocks which are illustrated in Figure 4.



**Figure 4.** Types of syllabic blocks.

As shown in Figure 4, a character can be formed by composing initial, medial, and final letters into a square block. The initial letter position is located at the upper or left stack, which is indicated by a gray box with a pattern of slanted lines in all diagrams. The final letter position is located at the bottom stack, which is depicted in a green box with a pattern of horizontal lines in the lower right diagram but in a white blank box elsewhere. The medial letter positions are located between the initial and final letter positions. Composite medial letters usually have sequences of a horizontal medial letter followed by a vertical one within the medial letter positions. However, a sequence of a vertical medial letter followed by a horizontal one occurs beyond the medial letter position when the final letter position is empty, as depicted in green with a pattern of vertical lines in the lower right diagram.



As shown in Figure 4, the two upper diagrams represent a character composed only of a single medial letter, either horizontal or vertical, whereas the two lower ones represent a character composed of two medial letters, horizontal and vertical. The lower left diagram shows a horizontal medial letter followed by a vertical one. However, the lower right diagram shows a horizontal medial letter preceded by a vertical one, where the final letter position is occupied by a horizontal medial letter. This configurationally demonstrates a vertical medial letter followed by a horizontal one which occupies the final letter position, as in ! and \_l.

The hypothesis that in a composite medial letter, the vertical medial letter precedes the horizontal one 'beyond' the medial letter position can be tested with empirical data. Kim(2013) reports that the medials of a vertical medial letter followed by a horizontal one occur in writing foreign languages in such a book as *Hancheongmungam*(漢淸文鑑). The present study, as an indirect way of investigation, examines a code page in a Korean version of Microsoft Word which seems to incorporate all composite medials reported to date, which is illustrated in Figure 5.



**Figure 5.** A code page in a Korean version of Microsoft Word including composite letters.



### 3. Discussion and Conclusion

Zev Handel (by personal communications) have recently suggested a different way of thinking about why the SD vowels are considered unitary vowels written with single symbols, instead of diphthongal vowels written with two vowel symbols (as the Vj vowels are). He added that perhaps phonetically the jV vowel combinations of Middle Korean were shorter and perceived as tightly-bound single units in comparison with the wV and Vj combinations.

Phonetics does not give us a proper answer to the question why the relationship between an onglide and V, as in [ja] which was included in the eleven Hunminjeongeum medial vowels unfairly and weirdly enough from the standpoint of phonetics, is tighter than that between V and an offglide, as in [aj] which has changed to [ɛ] in a later stage of the development of the Korean language weirdly enough from the standpoint of writing system. If the level of tightness matters, the two parts that were less tight, a vowel followed by an offglide, might have been separated into different blocks, like 액 into 아·익, or the two parts that were tighter, a vowel preceded by an onglide, might have been smoothed into a monophthong, like 액 into 액. However, it is difficult to see such a major trend in the history of the Korean language. This question would be better handled solely from the perspective of writing system, since the operating system of the letters and the constraints on letter shape are working in practice, though sometimes invisible. This approach gives us a neat answer that composite letters are, by definition, a sequence of unitary letters. As is clearly stated in the descriptions of the Hunminjeongeum, ㅓ is a sequence of ㅏ and ㅣ, and ㅗ is a sequence of ㅓ, ㅣ, and ㅣ. It is doubtless that ㅜ is a composition of ㅓ and ㅣ, and ㅛ is a composition of ㅓ and ㅣ. Thus, it can be interpreted that the composite letters, ㅓ, ㅗ, ㅜ, and ㅛ, are, in fact, concatenations of unitary letters, ㅏ, ㅣ, ㅓ, ㅓ, and ㅣ. This interpretation leads us to a conclusion that the eleven Hunminjeongeum medial letters are a collection of unitary letters.

This study investigated the characteristics of the Hunminjeongeum me-

dial letters from the perspective of writing system. The SDs were examined in terms of the constraints on letter shape, the operating system of the letters, and the constraints on the syllabic block. The present study asked questions about why a dot was employed as a graphical device for an onglide [j] of the SDs, why only the SDs were included in the eleven Hunminjeongeum medial letters, and why ! and \_| were described separately and different from the other diphthongal letters. The present study provided answers to the questions about the Hunminjeongeum medial letters. First, a graphical device · was used for an onglide [j] instead of | to avoid confusion in the operating system of the letters. The eleven Hunminjeongeum medial letters are a collection of unitary letters which are concatenated with each other to form composite medials. ! and \_| are unavoidable choices to avoid confusion in the operating system of the letters, so that they fill the *case vide* in the symmetric sets of diphthongal medials, showing that the vertical medial letter precedes the horizontal one 'beyond' the medial letter position which is empty.

This study investigated the characteristics of the Hunminjeongeum medial letters by reinterpreting the statements of the *Hunminjeongeum Haerye*. This study examined a code page of a word processor as an indirect method of investigation into the shape of the letters. It would be more helpful to look into the usage of the Hunminjeongeum medial letters in a number of documents that have published since the invention of the Hunminjeongeum letters. This remains to be studied. The present study investigated the characteristics of the Hunminjeongeum medial letters from the perspective of writing system. This approach could possibly provide a holistic view of the Hunminjeongeum medial letters.

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